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Non-woven shape-memory polymer blend actuators

Victor Izraylit, Matthias Heuchel, Karl Kratz, Andreas Lendlein

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Synthesizing shape-memory polymer actuators can be achieved by different techniques; however, controlling the molecular orientation that comes with the production of polymeric fibers and the shape-memory properties is still challenging. The authors propose the electrospinning technique to obtain microfibers and achieve a higher molecular orientation, the efficient cross-linking of a network and the enhancement of the soft actuator performance of these polymeric blends. https://doi.org/10.1557/s43580-021-00063-8

Improving electric thermal stability of polypropylene by chemically linking small amount of hindered phenol groups

Xin Chen, Wenyi Zhu, Q.M. Zhang

Polypropylene (PP) has been studied for a wide variety of applications, but its thermal stability is one of the most important features when synthesized. The authors modify PP with some hindered phenol groups to determine its thermal and electrical properties, suggesting that the addition of this group enhance the electrical properties but diminish the crystallinity; however, the polymeric films maintain certain rigidity compared with the pristine PP film. https://doi.org/10.1557/s43580-021-00016-1

Structural, thermal and morphological studies of bio-based straws under aerobic degradation process

A. de la Luz Ramos, G. Pineda Flores, D. Palma-Ramírez, H. Dorantes-Rosales

Single-use plastic, such as bags, cutlery, and drinking straws cause serious environmental damage because their disposal is not regulated in many countries. The authors study five types of fossil-based drinking straws to determine if they are suitable for compost. By measuring the thermal, structural, and morphological characteristics, the authors determine that some of the studied straws, tagged as biodegradable polymers, have biodegradable and fossil nature polymers in their composition. https://doi.org/10.1557/adv.2020.377

Developing new antiferroelectric and ferroelectric oxides and chalcogenides within the A_2BX_3 family

Aaliyah C. Khan, Autumn S. Cook, Joshua A. Leginze, Joseph W. Bennett

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The authors develop methodology to search for polar instabilities in known nonpolar and antipolar compounds, identifying new Pb-free oxides and chalcogenides with a wide range of bandgaps to be used as solid-state photovoltaics. They report on a targeted set of new materials to synthesize and design routes to obtain ferroelectrics and antiferroelectrics with energetic barriers amenable to switching with an electric field. https://doi.org/10.1557/s43578-021-00410-3

Deformation and fracture characteristics of zirconium plate produced via ultrasonic additive manufacturing

Caleb P. Massey, Nitish Bibhanshu, Maxim N. Gussey, Cody J. Havrilak, Andrew T. Nelson

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The authors present microstructural evolution, deformation modes, and fracture mechanisms of zirconium plate produced using ultrasonic additive manufacturing (UAM). Digital image correlation captured highly variable strain accumulation in specimens loaded perpendicular or parallel to the build height (Z). Mixtures of ductile and delamination-induced fracture highlight the interface-driven failure modes of UAM zirconium plate in the as-built condition. https://doi.org/10.1557/s43578-021-00380-6

3D bioprinting for esophageal tissue regeneration: A review

Kirthanashri S. Vasanthan, Varadharajan Srinivasan, Vidhi Mathur, Prachi Agarwal, Neha Negi, Simran Kumari

Vital for survival in all organisms, the esophagus is non-regenerative, and currently available medical interventions are not highly effective to treat infection and congenital disabilities. Tissue engineering can mimic the native microenvironment and fabricate tubular scaffolds to address partial and full-length defects of the esophagus. The authors detail state-of-the-art alternatives for esophageal tissue engineering, discussing 3D printing with suitable bioinks, stem cell interventions, and *in vivo* models for esophagus regeneration. https://doi.org/10.1557/s43578-021-00409-w

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